ABSTRACT OF THE DISCLOSURE

Automated Method and System for the Segmentation of Lung
Regions in Computed Tomography Scans

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A method and system for the automated segmentation of the lung regions in thoracic CT scans includes construction of a cumulative gray level profile from pixels along the diagonal of each CT section image. The shape of this profile is used to identify a gray level threshold that is used to create a binary image. A contour detection algorithm generates a segmented thorax region. The trachea and main bronchi are segmented and eliminated from the segmented thorax region to prevent subsequent inclusion within the segmented lung regions. A gray level histogram is constructed to identify a second gray level threshold, which is applied to the segmented thorax region to create a binary image. If the two lungs regions are "fused," the anterior junction is then delineated and turned "off" in the binary image to separate the two lungs. The geometric properties of "holes" within the binary image are analyzed to identify holes caused by the diaphragm. Pixels within such holes are specifically excluded from the segmented lung regions. A contour detection algorithm is used to identify the outer margins of the largest "on" regions in the binary image (excluding pixels identified as diaphragm) to define the segmented lung regions. The segmented lung regions are modified by a rolling ball technique designed to incorporate pixels that may have been erroneously excluded by initial gray level thresholding. A second diaphragm analysis is performed to prevent the rolling ball technique from incorrectly including pixels that belong to the diaphragm.

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